



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

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BOSTON, MA 02114-2023

Memorandum

To: File
Date: 9/19/08
Subject: PAH Sampling frequency
ExxonMobil MA0000833, Final Permit
From: Ellen Weitzler

In responding to a comment from CLF (see comment 72, paragraph C), I took another look at the sampling frequencies for PAHs. To put this into context:

- the monitoring frequency for the current permit is quarterly for PAHs and monthly for other parameters (except WET)
- there are effluent limits for PAHs
- the draft permit calls for continuing the quarterly monitoring for PAHs and monthly monitoring for BTEX.

The CLF comments says:

“A quarterly measurement frequency leaves open large windows where violations can occur. Thus EPA should more thoroughly justify the decision to require quarterly testing for all sixteen PAHs, as opposed to monthly or weekly.”

Using a statistical approach consistent with that described in the response to comments for the Non-Contact Cooling Water (NCCW) general permit (July 2008), I evaluated the relative benefit to increasing the sampling frequency from quarterly to monthly or weekly. The methodology used here is described in section 3.3.2 of the *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, March 1991.

The statistical equation that represents the relationship between confidence level (uncertainty), the percentile represented by the highest concentration in the data, and the number of samples is given below:

$$P_n = (1 - \text{confidence level})^{1/n}$$

Where P_n is the percentile represented by the highest concentration in the data, and n is the number of samples. Since we are limiting the maximum daily PAH level in this permit, P_n equals 0.99 (i.e., the 99th percentile). Increasing the number of samples from quarterly to monthly or weekly will result in 60 or 260 samples versus 20 samples, collected over a five year permit period.

After using the above equation and solving for the confidence level, the results show that increasing the sampling number, n , from 20 to 60 will increase the confidence level from approximately 18% for quarterly sampling to 45% for monthly or 93% for weekly sampling. Given the dramatic rise in

confidence level by changing the sampling frequency, EPA believes an increase is warranted for the term of this permit. Although weekly monitoring would provide a greater level of certainty it would be substantially more expensive than the current monitoring program. Monthly sampling would be a cost effective improvement and would be consistent with the sampling requirements for other organic parameters limited in the permit as well as enforcement monitoring at other bulk petroleum storage facilities in the area (see ConocoPhillips internal outfall 002 monitoring for PAHs). Therefore, the PAH monitoring frequency has been increased in the final permit from quarterly to monthly.